NASA STTR 2009 Phase I Solicitation

T1.01 Information Technologies for System Health Management and Sustainability

Lead Center: ARC

Information technology is a key element in the successful achievement of NASA's strategic goals. Modern tools and techniques have the capability to redefine many design and operational processes as well as enable grand exploration and science investigations. This subtopic seeks innovative solutions to the following information technology challenges:

- Enabling technologies for sustainable systems such as life-cycle cost analysis, including production impact of system maintenance and upgrades, testing methodologies to maximize the efficiency of energy systems, optimization of limited resources, and smart energy systems that self-monitor and adjust accordingly to changing conditions;

- Health management systems that perform quickly enough to monitor a flight control system in a highly dynamic environment and respond to anomalies with suggested recovery or mitigation actions;

- Data fusion, data mining, and automated reasoning technologies that can improve sustainability, increase identification of system degradation, and enhance scientific understanding;

- Techniques for analyzing and reasoning from development and operational data sets to identify degradation of components and predict remaining useful life;

- Techniques for interconnecting and understanding large heterogeneous or multidimensional data sets or data with complex spatial and/or temporal dynamics;

- Computational and human/computer interface methodologies for inferring causation from associations and background knowledge for scientific, engineering, control, and performance analyses.